

IN THE CLAIMS:

Claim 1 (original): A heat emitting probe comprising:

a conductive nanotube probe needle with a base end portion thereof fastened to a holder and a tip end portion thereof protruding,

a heat emitting body provided on a circumferential surface of said conductive nanotube probe needle, and

a conductive nanotube lead wire fastened to said heat emitting body.

Claim 2 (original): A heat emitting probe comprising:

a conductive nanotube probe needle with a base end portion thereof fastened to a holder and a tip end portion thereof protruding,

a heat emitting body provided on a circumferential surface of said conductive nanotube probe needle,

a conductive nanotube lead wire fastened to said heat emitting body, and

a means for causing an electric current to pass through both ends of said conductive nanotube lead wire and said conductive nanotube probe needle, wherein

an electric current is caused to pass through said heat emitting body.

Claim 3 (currently amended): The heat emitting probe according to Claim 2, wherein:

an atomic force microscope (AFM) [[AFM]] cantilever in which a protruding portion used as said holder is formed on a cantilever portion thereof is employed,

two electrode films are provided on said cantilever portion,

one end of said conductive nanotube lead wire is connected to one of said electrode films, and

said conductive nanotube probe needle is connected to another of said electrode films, wherein

said electric current is caused to pass between said electrode films.

Claim 4 (currently amended): The heat emitting probe according to Claim 2, wherein:

an atomic force microscope (AFM) [[AFM]] cantilever in which a protruding portion used as said holder is formed on a cantilever portion thereof is employed,

two electrode films are provided on said cantilever portion,

one end of said conductive nanotube lead wire is connected to one of said electrode films, and

said conductive nanotube probe needle and another of said electrode films are connected by means of another conductive nanotube lead wire, wherein said electric current is caused to pass between said electrode films.

5. A heat emitting probe apparatus comprising:

 said heat emitting probe according to Claim 2, 3 or 4,
 a scanning mechanism that allows a tip end of said conductive nanotube probe needle of said heat emitting probe to scan over a sample, and

 a control circuit which passes an electric current through said tip end of said conductive nanotube probe needle, wherein

 said tip end of said conductive nanotube probe needle scans a surface of a sample.

6. The heat emitting probe apparatus according to Claim 5, wherein

 said sample is a thermal recording medium, and

 said tip end of said conductive nanotube probe needle is heated by said heat emitting probe, and wherein

 information is recorded by means of a hole pattern formed in a surface of said thermal recording medium.

7. The heat emitting probe apparatus according to Claim 5, wherein said tip end of said conductive probe needle scans over said sample surface while being heated by said heat emitting probe, thus detecting thermal conductivity distribution of said surface of said sample by means of variations in an amount of radiant heat from said heat emitting body or variations in resistance of said heat emitting body.

8. The heat emitting probe apparatus according to Claim 5, wherein said surface of said sample is scanned by said tip end of said conductive nanotube probe needle using said heat emitting probe, thus detecting temperature distributions of said surface of said sample as variations in resistance of said heat emitting body.